

# AGRICULTURAL EDUCATION IN MISSOURI

Agriculture and the food, fiber and natural resource system is America's most creative, productive and basic industry. Much of this country's success in agriculture can be attributed to a sound program of education. To advance a dynamic and efficient agriculture, food & natural resource system and to assure the continued well-being of our society, first-rate education must continue to be a high priority. A cooperative effort among educational institutions, government agencies and food, fiber and natural resource-related businesses will help Missouri provide leadership for the future through enhanced education.

## **Developments shaping food, fiber and natural resource systems**

Participants representative of the food, fiber and natural resource industry were asked to identify the most important trends and developments over the next 30 years that will shape the future of agriculture and the food, fiber and natural resource systems. Five trends emerged as most important.

### *→ Accelerating globalization of markets.*

- ◆ Economic globalization with increasing population and falling trade barriers is taking us toward a more competitive international marketplace for agricultural products in which more countries will produce more kinds of foods and market them on an international scale.

### *→ Growing public demands for environmental protection and safe foods.*

- ◆ As production increases worldwide, pressures will grow everywhere to protect prime farmland from urban sprawl, conserve soil, safeguard water quality and fisheries, use water more efficiently, protect remaining wildlife habitats, and ensure a safe and healthy food supply.

### *→ Increasing reliance on technology.*

- ◆ Advances in computers, communications, information, biotechnology and other areas of technology will greatly affect education, agriculture and the operation of the food, fiber and natural resource systems.

### *→ Decline public understanding of Agriculture, Food, Fiber and Natural Resource Systems.*

- ◆ The general population is increasingly cut off from both direct experience and education related to Agriculture, which has serious repercussions in terms of ill-informed consumer behavior, public opinion, regulation and political decision-making.

### *→ A more highly trained and diverse workforce.*

- ◆ A more diverse, highly trained workforce will be needed to manage the development of food, fiber and natural resource systems so that they will be competitive in the global marketplace and successful in an industry whose structure is changing.

## About Agricultural Education

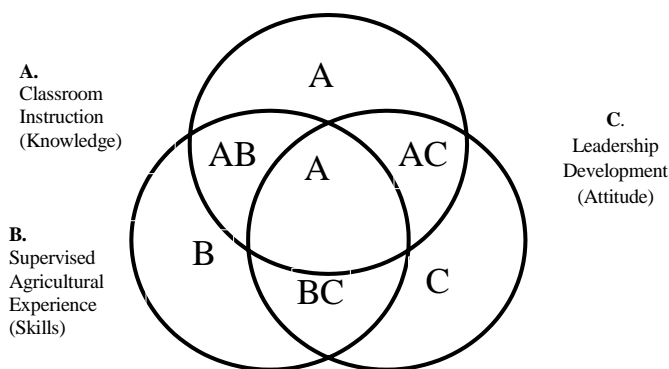
Agricultural education is a systematic program of instruction available to students desiring to learn about the science, business, and technology of plant and animal production and/or about the environmental and natural resources systems. Agricultural education first became a part of the public education system in 1917 when the U.S. Congress passed the Smith-Hughes Act. Today, over 900,000 students participate in formal agricultural education instructional programs offered in grades seven-adult throughout the 50 states and three U.S. territories.

***Ag Ed Vision:*** *Agricultural education envisions a world where all people value and understand the vital role of agriculture and natural resources in advancing personal and global well-being.*

***Ag Ed Mission:*** *Agricultural education prepares students for successful careers and a lifetime of informed choices in the global agriculture, food, fiber, and natural resources systems.*

## Agricultural Education Delivery Systems

Agricultural Education - prepares secondary, postsecondary and adult students for a variety of careers and advanced college or technical training in the Agriculture, Food and Natural Resources System. Career opportunities for students range from positions in agribusiness, food science, agricultural mechanics and technology, plant science and horticulture, animal science, and natural resources conservation. Programs of study are delivered by the following: four-year "cluster" programs at comprehensive high schools and area career centers; two- year community college "specific" programs; and "supplemental" and "specific" adult education in high schools, area career centers and community colleges. At each level, training programs consist of three interrelated components:



**A.** Classroom/laboratory instruction using the “problem- solving” technique.

**B.**Supervised agricultural experience in which each student gains “hands- on” experience outside the classroom.

**C.**Leadership development through the FFA in high school, PAS at the postsecondary institutions, and Young Farmers for adults currently employed in agriculture.

## Missouri Agriculture Enrollment Trends

The following table shows total enrollment in secondary, postsecondary and adult agriculture programs. High school agriculture enrollment has increased steadily since 1985 and is currently at an all-time high. This reverses a trend of declining enrollment that began in 1977. Factors which contribute to the increasing enrollment have not been formally studied, but teachers and others indicate they believe that: 1) the economic improvement of agriculture affects attitudes of parents, students and counselors toward enrolling; and 2) agriculture programs have expanded content and increased flexibility. Postsecondary enrollment has also increased in response to a changing agriculture and the public attitude about the future of agriculture. Adult enrollment has fluctuated since reaching a peak enrollment in 1985-86.

### Total Student Enrollment

<u>Year</u>	<u>No. of Programs</u>	<u>Secondary</u>	<u>Junior High</u>	<u>Postsecondary</u>	<u>Adult**</u>
2021-2022	353	35,816	15,534	2554	2,392
2020-2021	351	36,068	14,226	2,921	3,970
2019-2020	348	36,685	13,340	2,881	3,650
2018-2019	347	36,516	13,375	2,163	3,357
2017-2018	344	36,114	13,289	2,222	3,174
2016-2017	342	37,165	11,359	1,918	3,371
2015-2016	340	33,455	12,874	2,187	3,288
2014-2015	334	27,701	13,167	2,439	2,465
2013-2014	331	26,724	12,125	2,521	2,026
2012-2013	327	26,564	12,274	1,890	1,288
2011-2012	326	26,813	12,471	1,909	1,537
2010-2011	324	26,455	11,963	3,295	1,802
2009-2010	316	26,473	11,245	1,008	3,037
2008-2009	311	26,254	10,732	1,158	3,110
2007-2008	305	25,452	10,429	779	3,585
2006-2007	302	25,180	11,452	317	2,841
2005-2006	301	25,162	10,798	2,246	4,264
2004-2005	294	23,827	9,611	797	2,630
2003-2004	291	22,953	9,850	2,756	2,637
2002-2003	286	21,800	9,835	3,102	2,373
2001-2002	284	21,174	9,850	661	2,308
2000-2001	277	21,196	7,665	702	3,181
1999-2000	266	20,616	7,146	842	3,068
1998-1999	266	20,294	7,620	672	2,906
1997-1998	263	20,169	7,678	672	3,340
1996-1997	258	19,048	6,717	653	2,594
1995-1996	253	18,205	5,571	681	3,076
1994-1995	249	17,441	4,545	680	2,704
1993-1994	247	16,652	4,428	602	3,007
1992-1993	245	15,132	4,071	477	3,650
1991-1992	245	13,920	2,950	405	4,190
1990-1991	244	13,993		371	3,803
1989-1990	243	13,705		471	3,721
1988-1989	244	13,555		408	3,852

\* Data from 13 institutions offering postsecondary agriculture.

\*\* Adult programs are operated as a part of local programs.

### Secondary Agricultural Education in the Public Schools

Agricultural education has been a part of the public education system throughout the history of our country. When the Latin grammar schools gave way to the academies of the late 1700s, agricultural courses were sometimes included in the curriculum. While these were general theoretical courses, many states made them a requirement for graduation. With the passage of the Smith-Hughes Act of 1917, many general agriculture courses were replaced with a course called "vocational agriculture."

to meet the needs of society and the work force. For example, the number of farmers has declined from 13.8% of the work force in 1947 to less than 1.4% in 2021. It is now estimated that agriculture/agribusiness provides 10.3% of all U.S. jobs. The Vocational Act of 1963 encouraged expansion of the vocational agriculture program to include training for entry into other agricultural occupations besides farming.

Non duplicated enrollment in high school agriculture in Missouri is 29,367 students. Currently, 353 comprehensive high schools and 43 area vocational schools offer agriculture. Of the students enrolled, over 42% are female. There are 514 agriculture teachers in secondary schools. In 2021-2022, the program was offered in 70% of Missouri's public school districts maintaining high schools, and approximately 10% of the high school students were enrolled.

High School agriculture is a four-year program. A student normally earns four to six credits. The following table shows course offerings and enrollments for the past nine years.

#### Course Offerings and Enrollments/Number of Schools

Courses	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21
Agricultural Science I	313	310	311	305	310	308	309	310	312
Agricultural Science II	275	277	280	283	275	268	274	270	263
Agricultural Management/Economics	66	80	60	66	61	59	59	59	52
Animal Science	158	157	153	176	169	172	180	173	175
Crop Science	33	38	45	41	34	47	45	47	39
Agricultural Sales & Marketing	83	88	83	86	83	62	86	63	64
Agricultural Power I	75	74	66	79	73	67	73	67	70
Agricultural Power II	15	18	14	14	20	17	14	17	17
Agricultural Machinery	32	38	30	32	35	39	33	39	42
Agricultural Structures	122	133	131	132	136	131	130	132	130
Agricultural Construction	227	218	223	220	222	218	230	220	212
Floriculture	49	55	45	41	44	46	52	46	58
Greenhouse Operation/Management	174	174	183	175	177	178	173	178	175
Nursery Operation & Management	26	21	12	20	20	20	17	21	18
Turf Management	15	8	8	10	5	7	7	7	8
Landscaping	70	65	78	64	65	77	66	77	64
Conservation Natural Resources	118	114	103	112	102	105	114	106	98
Forest Management	24	26	28	20	19	19	18	20	17
Supervised Occup. Exp. In Ag (Co-op)	81	73	81	73	81	115	76	75	81
Agricultural Other	0	0	0	0	0	0	0	0	0
Agricultural Literacy								0	0
Food Science & Tech	56	54	56	57	51	63	61	64	68
Agricultural Communications	94	89	87	96	108	108	97	108	104
Biotechnology	10	7	6	6	8	7	6	7	6
Equine Science	10	8	11	10	9	12	11	12	9

#### Number of Students Enrolled

Courses	12-13	13-14	14-15	15-16	16-17	17-18	18-19	19-20	20-21
Agricultural Science I	9774	9818	9557	9927	9583	9702	9773	9487	9439
Agricultural Science II	5212	5357	5424	5673	5150	4961	4976	4964	4931
Agricultural Management/Economics	660	591	718	717	648	637	632	551	482
Animal Science	1945	1925	2064	2406	2390	2342	2347	2327	2389
Crop Science	405	607	491	644	430	548	546	512	446
Agricultural Sales & Marketing	684	680	702	855	837	932	616	656	567
Agricultural Power I	880	852	943	1121	958	921	810	770	811
Agricultural Power II	150	142	177	149	212	151	158	149	170
Agricultural Machinery	595	498	575	583	582	548	611	534	708
Agricultural Structures	1447	1605	1645	1582	1641	1535	1579	1450	1458
Agricultural Construction	2716	2761	2793	3405	3249	3193	3109	3186	3023
Floriculture	597	560	794	648	611	762	778	807	733
Greenhouse Operation/Management	2198	2379	2069	2529	2620	2397	2439	2461	2520
Nursery Operation & Management	276	236	260	198	260	142	221	211	217
Turf Management	157	147	55	128	73	119	76	90	76
Landscaping	648	703	685	773	783	808	919	791	795
Conservation Natural Resources	1389	1291	1319	1487	1428	1479	1461	1320	1458
Forest Management	297	316	276	275	256	269	229	197	249
Supervised Occup. Exp. In Ag (Co-op)	458	507	395	527	622	639	575	664	585
Agricultural Other	0	0	0	0	0	0	0	0	0
Agricultural Literacy	0	0	0	0	0	0	0	0	0
Food Science & Tech	623	614	579	687	645	778	728	841	914
Agricultural Communications	734	748	789	924	955	837	1001	929	956
Biotechnology	156	154	111	118	96	85	125	81	84
Equine Science	128	189	111	168	146	140	199	156	142
Veterinary Science	308	432	436	441	431	667	583	629	624

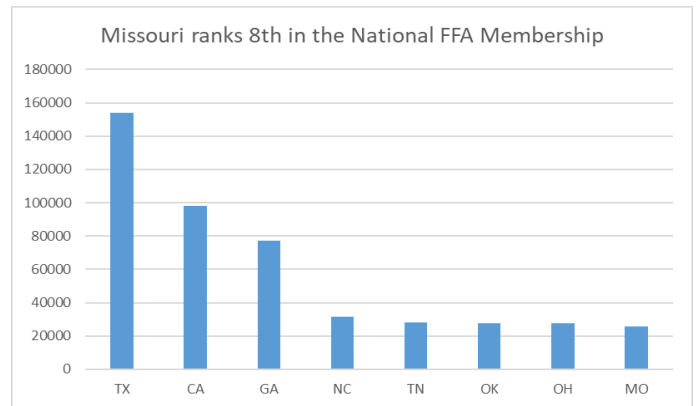
## Student Career Interest

All students enrolled in agriculture programs are asked to identify an agricultural interest in one of six Agricultural Career Cluster areas. The following percentages reflect student choices in 2021-2022

	% of Total	With-in Cluster Pathway
Agricultural Business/Management Systems	15%	Males-51% Females-49%
Agricultural Mechanics & Technology	32%	Males-90% Females-10%
Animal Science Systems	26%	Males-34% Females-66%
Food Science Systems	7%	Males-45% Females-55%
Natural Resources/Conservation Systems	10%	Males-67% Females-33%
Plant Science/Horticultural System	10%	Males-37% Females-63%

## FFA Membership

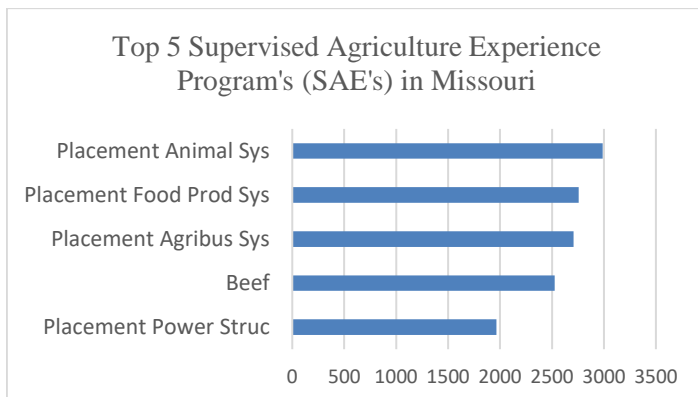
FFA activities are designed to teach leadership and promote personal skill development. Students can become involved at the area, district, state and national levels in various ways. Each agriculture program in Missouri has a chartered FFA chapter. The 2021-2022 membership in the Missouri FFA was 26,260.



## Supervised Agricultural Experience

Each student is counseled to select courses and Supervised Agricultural Experience Program (SAEP) activities that relate to their agricultural interest.

Of the 72% of students who completed SAE programs in 2022, 16% had ownership projects and 48% had placement projects (working for someone in an agribusiness or on a farm). The average SAEP net income per student for 2022 was \$3,222. Statewide, over \$58,195,602 net income was generated through SAE programs.



<u>Year</u>	<u>Avg. Net Income Per Student</u>	<u>State-wide Net Income</u>
2022	\$3,222	\$58,195,602
2021	\$3,275	\$57,406,955
2020	\$3,009	\$51,452,197
2019	\$2,755	\$48,943,868
2018	\$2,990	\$50,586,030
2017	\$2,786	\$52,529,788
2016	\$2,716	\$46,414,747

These were the types of projects chosen students in 2020-2021.

### **Ownership Projects**

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Horses	1570	1439	1152	1139	1125	1077	996	606	987	1017
Dogs	1345	1231	995	954	991	989	1037	620	934	974
Rabbits	448	446	444	446	431	417	378	204	439	456
Goats	571	528	518	516	481	487	516	300	560	567
Fish	37	36	17	20	23	15	20	19	15	15
Bees	31	42	60	56	76	1194	84	55	73	74
Poultry	979	1002	993	1055	1154	1064	1099	683	1072	1098
Sheep	390	365	351	332	349	374	321	216	378	386
Swine	903	822	963	917	961	914	880	595	894	916
Dairy	189	145	134	129	135	93	114	68	114	132
Beef	2904	2647	2407	2359	2405	2845	2325	1703	2369	2526
Agribusiness	1067	1126	1118	1791	1157	746	1127	630	960	1019
Custom Work – Other	495	427	450	56	55	11	12	3	0	66
Vegetables	425	415	422	325	280	343	433	152	371	379
Plants	431	343	274	235	226	237	313	73	278	286
Berries/Grapes	44	45	56	39	38	24	26	18	24	24
Trees/Wood lot	133	133	139	125	130	154	189	108	133	135
Sunflowers	4	4	10	8	5	2	4	2	4	4
Tobacco	0	3	2	1	1	1	0	1	0	0
Forages/Hay	244	237	186	189	156	154	173	105	184	190
Rice	5	2	1	1	3	3	4	4	4	4
Cotton	7	7	6	5	1	5	4	2	2	2
Soybeans	302	282	221	299	186	197	377	116	334	336
Milo	9	8	15	9	8	7	18	2	3	3
Corn	233	213	190	158	171	157	182	98	173	174
Wheat	109	82	73	61	59	54	55	23	42	42
Hams				303	355	318	363	282	274	274
Small Grain				10	9	4	9	8	5	5
Pasture				309	305	288	328	196	322	327
Tree Nuts				14	11	19	23	1	12	12

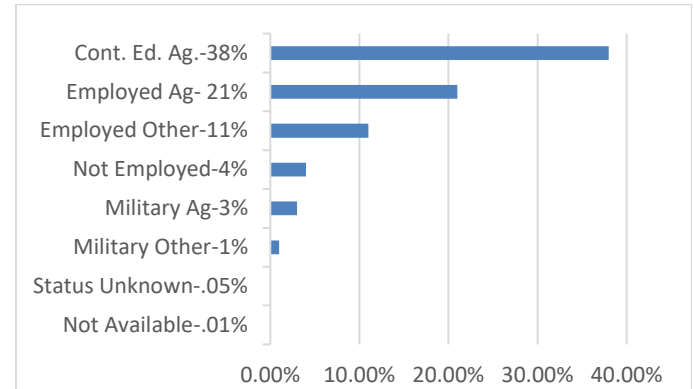
### **Placement Projects**

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Agribusiness Sys	8264	7874	7707	4004	3671	3719	3619	2300	2533	2706
Food Prod/Proc Sys	5746	5470	5557	2417	3455	2983	3002	1899	2,689	2757
Directed Lab unpaid	1330	1502	1535	692	472	619	702	395	569	620
Animal Systems				3325	3407	3068	3053	3273	2,819	2988
Biotech Systems				38	29	93	94	42	27	35
Enviro Science Sys				289	356	285	378	217	305	323
Natural Res Sys				581	1051	617	561	424	596	608
Plant Systems				1553	1603	1397	1727	1100	287	1628
Power Struct/Tech Sys				1401	1624	1710	2585	1304	1,922	1966
Agriscience unpaid				768	248	188	286	225	362	367
Exploratory unpaid				1121	653	506	685	397	697	697
Analytical unpaid				707	527	87	21	57	18	18

## Graduate Placement

In 2020, there were 4,413 high school agricultural education graduates. Of this number 91.9% were placed.

32% are employed  
 21% in agriculture  
 11% in other areas  
 57% are continuing their education  
 38% in agriculture  
 19% in other areas  
 4% are in the military  
 3% in agriculture related fields  
 1% in non-agriculture related fields  
 4% are not employed  
 <4% are not available for employment  
 <2% could not be found (status unknown)  
 Of the total, 67% are pursuing agriculture as a career.



## Postsecondary Agricultural Education

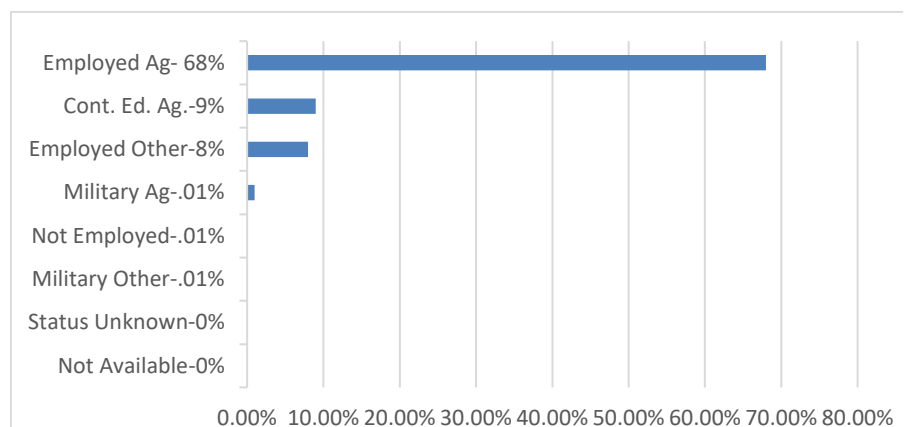
Thirteen community colleges and one state technical college in Missouri staffed with 16 instructors currently offer postsecondary-level training in agriculture. During 2020-2021, these 13 institutions served 2,554 students in 8 career programs:

- Agricultural Production/ Farm Management
- Animal Health Technology
- Agricultural Business
- Agricultural Equipment
- Agricultural Power and Machinery
- Horticulture
- Landscape, Nursery and Turf Management
- Biotechnology

The typical postsecondary student is a high school graduate who wants to train for a middle-management position and/or transfer to a baccalaureate institution. Postsecondary programs provide 64 credit hours of instruction in a two-year program for a full-time student. Programs include supervised occupational experience gained through internships and on-the-job training. Students are employed throughout Missouri and, in some cases, in other states. In most areas, students are paid for their services during the internship and also receive academic credit.

Of the 109 postsecondary/adult (2 year) agriculture graduates in 2020, 91.9% are placed.  
 76% are employed  
 68% in agri  
 8% in other areas  
 9% are continuing their education in agriculture  
 14% are continuing their education not in agriculture  
 .01% are not employed  
 0% are not available for employment  
 0% could not be found (status unknown)

Of the total, 77% are pursuing agriculture as a career.



Leadership development is available through the Missouri and National Postsecondary Agricultural Student Organizations (PAS). The Missouri Postsecondary Agricultural Student Organization (MPASO) was established in 1981. Membership is open to any student enrolled in a postsecondary agriculture program. In Missouri, seven institutions have local PAS organizations. PAS members have the opportunity to participate in the state conference where contests are held, state officers are elected and the state business is conducted.

## **Adult Agriculture**

Adult agriculture classes were organized soon after the Smith-Hughes Act was passed in 1917 and have been recognized as a part of agricultural education ever since. Several types of adult education have been offered through the years in Missouri.

"Topics" classes that highlight one-session meetings have long been, and still are, a viable part of adult education in agriculture. These classes tend to address current problems and issues, update enrollees with new technologies, and explore subjects of general interest to a fairly diverse audience. Currently, they are the most common type of adult class offered. "Topics" classes typically include 8 to 12 sessions and meet weekly, biweekly or monthly, primarily during the winter months.

"In-depth" classes are becoming a popular way of providing education to adults in agriculture. An "in-depth" class is a series of sessions on the same topic (for example, a two-to-eight session series in horticulture, marketing, forestry or ag mechanics). Because content is specialized, enrollment is sometimes lower. Traditionally, "topic" and "in-depth" classes are offered as a part of local programs, and instructors are paid an hourly rate based on instructional time.

The Farm Business Management Analysis (FBMA) program is a third type of adult education in agriculture. The program involves class work, on-site visitations and record analysis, all designed to improve the management of the farm business and to help farmers achieve their personal, financial and farm business goals.

A significant development in adult leadership training was the formation of the Missouri Young Farmers/Young Farm Wives organization in 1972. This organization involves adults in educational and leadership activities at the local, district, state and national levels. Membership in the organization is open to persons of any age. State activities include a 2-day convention in February, a 2 1/2-day tour in August and participation in the Governor's Conference on Agriculture.

These facts and figures describe the status of adult agricultural education in Missouri:

- 2,554 adults enrolled in DESE reimbursed agriculture classes in 2020-2021.
- 24 schools received DESE reimbursement for adult classes in 2019-2020.
- There were 26 active Young Farmers/Young Farm Wives chapters in 2020-2021. State membership totaled 429.
- Agriculture instructors in 39 schools had part or all of their time scheduled for adult instruction in 2020-21 and over 175 farm families enrolled in the FBMA program.



## **The Development of Professional Teachers of Agriculture**

Missouri law and the Department of Elementary and Secondary Education's regulations require all teachers and administrators in vocational education programs to be specifically certificated for their teaching assignments.

In 2021, Missouri had six institutions training agriculture teachers: University of Missouri-Columbia, Northwest Missouri State University at Maryville, Southeast Missouri State University at Cape Girardeau, Missouri State University at Springfield, College of the Ozarks, Point Lookout and University of Central Missouri at Warrensburg.

Pre-service programs alone cannot adequately prepare all teachers in all competencies. Therefore, professional development programs are designed and offered to assist the teachers in meeting their needs and the needs of their clientele. The program is jointly planned by teachers, teacher educators and state supervisors. A Professional Development Specialist manages the state-wide effort.

## **Agriculture as a Part of General Education**

Agricultural education began in this country as a part of general education. Passage of the Smith- Hughes Act in 1917 promoted the concept of "vocational agriculture" as a separate program. The narrow focus of vocational agriculture was broadened somewhat through the Vocational Education Act of 1963, which encouraged training for non-farm agricultural occupations. Today, however, the basic differences between the "general" and "vocational" approaches remain.

Our society's basic knowledge of agriculture is declining. More and more people in agriculture-related jobs will know less and less about their industry. In addition, a growing number of young people who do not have a background in farming or agriculture are training for agriculture-related occupations. For example, 40-45% of the students now enrolled in the University of Missouri-Columbia's College of Agriculture are non-farm, urban students. Another important issue today is providing a vocational education for adults. Many adults, for example, are interested in studying agriculture--not for career purposes, but to meet a vocational, hobby or secondary-income objectives. Additionally, more public and social interest is being focused on issues related to agriculture, food and the environment. Such trends signal a need for students and citizens in general to be better informed about the importance of agriculture and its relationship to their lives. In other words, our American society needs to be agriculturally literate.

Several projects are now underway in Missouri to develop agricultural literacy by promoting public awareness and understanding of agriculture's role in our economy and society. At the junior high/middle school level, Agricultural Literacy courses were offered in 2021-2022 to 15,534 seventh and eighth grade students in 249 schools. Other examples of this effort are the "Agriculture in the Classroom" project, supported by Missouri Farm Bureau and the Ag Ed on the move program by farmers care and commodity organizations, which introduce young students to concepts about agriculture and food production.

Building public awareness and understanding about issues and trends affecting agriculture in our state and nation is vital to having an informed citizenry.